Abstract Submitted
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CP-Violation in the Top-Higgs Interaction at Future Muon Colliders[1] MORGAN CASSIDY, YANZHE ZHANG, IAN LEWIS, KYOUNGCHUL KONG, YA-JUAN ZHENG, ZHONGTIAN DONG, University of Kansas — The Standard Model (SM) of Particle Physics has been very successful in explaining most observed phenomenologies. However, it cannot explain the observations of dark matter, matter-antimatter asymmetry, etc. Our project focuses on proposing a search for a new source of CP Violation in the top-Higgs interaction at a future muon collider to better understand matter-antimatter asymmetry. Simulations of $\mu^+\mu^-$ collisions are done in both the SM ($\alpha = 0$) and with a CP-violating phase ($\alpha \neq 0$) through Madgraph5_aMC@NLO, a Monte Carlo simulation framework for event generation and analysis. We present the varying cross-sections for different CP values and kinematic distributions for an $\alpha \neq 0$ case and show corresponding signal-to-background significance calculated for collisions at 1 TeV, 10 TeV, and 30 TeV. We incorporate the detector effects in various kinematic distributions to better simulate the collider environment. Further studies will be done on other CP phases to investigate the sensitivity of observing a CP-violating phase at the muon collider.

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